

### **REMARKS**

Please reconsider the application in view of the above amendments and the following remarks. The Applicants thank the Examiner for carefully considering this application.

#### **Drawings**

The Applicants thank the Examiner for indicating that the originally filed drawings are acceptable.

#### **Interview Summary**

Applicants thank the Examiner for courtesies extended during the Examiner Interview conducted on March 5, 2008. Applicants have reviewed the Interview Summary issued on March 18, 2008 and provide the following supplemental comments:

- (1) Applicants wish to clarify that the prior art discussed during the Examiner Interview was Aberth.
- (2) The amendments discussed during the Examiner Interview are consistent with those presented in this response.
- (3) The arguments discussed during the Examiner Interview are consistent with the arguments presented in this response.
- (4) Applicants have reviewed the "Substance of the Interview" section of the Interview Summary and agree with its contents.

**Disposition of Claims**

Claims 1-17 and 30-37 were pending in this application. Claims 9, 16, and 36 have been cancelled by this reply without prejudice or disclaimer. No new claims have been added by this reply. With respect to the pending claims, claims 1 and 30 are independent. The remaining pending claims depend, directly or indirectly, on claims 1 and 30.

**Claim Amendments**

Claims 1 and 30 have been amended to clarify the invention and correct minor typographical errors. Support for the amendments may be found, for example, in paragraphs [0020]-[0044] of the original specification. Claims 3, 4, 6-8, 10-11, and 15 have been amended for consistency with amendments made to independent claim 1. Finally, claims 32, 33, 35 and 37 have been amended for consistency with amendments made to independent claim 30. No new matter has been added by any of the aforementioned amendments.

**Rejections under 35 U.S.C. § 103**

Claims 1-3, 6-8, 10-11, 13-17, 30-35 and 37 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,085,029 ("Kolawa") in view of the article entitled "Precise Computation Using Range Arithmetic, via C++" ("Aberth"). Claims 9, 16, and 36 are cancelled by this reply. Accordingly, this rejection is now moot with respect to cancelled claims 9, 16 and 36. To the extent that this rejection may still apply to the remaining claims, this rejection is respectfully traversed.

MPEP § 2143 states that “[t]he key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. The Supreme Court in KSR noted that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit.” Further, when combining prior art elements, the Examiner “must articulate the following: (1) a finding that the prior art included each element claimed, although not necessarily in a single prior art reference, with the only difference between the claimed invention and the prior art being the lack of actual combination of the elements in a single prior art reference....” MPEP § 2143(A).

Amended independent claim 1 requires, in part: (i) performing accuracy-aware analysis of a program using a runtime logging utility, where the program includes floating-point variables; (ii) that the runtime logging utility is called for each operation performed on the floating point variable; and (iii) for each operation, the runtime logging utility:

- (a) increments the operations variable associated with the operation performed on the floating-point variable,
- (b) determines a scaled mantissa for the resultant value,
- (c) compares the scaled mantissa with the resultant value to determine if it is exact,
- (d) quantifies the error, if any, to obtain an error value, and
- (e) stores the resultant value, the scaled mantissa, and the error value, or the resultant value and the scaled mantissa in the accuracy-aware tracking structure.

Turning to the rejection, the Examiner admits that Kolawa fails to disclose “source code comprises[sic] a floating-point variable and using the accuracy-aware tracking structure to track an operation on the floating-point variable” (*See* Office Action mailed January 2, 2008, p. 4). Rather, the Examiner relies on Aberth to teach that which Kolawa lacks. Applicants assert that Aberth fails to teach that which Kolawa lacks.

Specifically, the Examiner states that Aberth discloses a method using range arithmetic to make the precision dynamically adjustable and permits error monitoring to determine error (*see* for example, p. 482, section 2, “Range Arithmetic”, lines 2-3; also *see* p. 486, section 4, “Range Arithmetic in C++”; further *see* code example at p. 488 and related text). Although Aberth does discuss a first step to “make the precision dynamically adjustable” and a second step to “permit error monitoring,” Aberth only allows for error monitoring using a set “PRECISION” (*see* Aberth, p. 482). In particular, Aberth discloses: “When the final results of a computation are printed to a specified number of decimal places, the ranges of these results can be used to ensure that only valid decimal digits appear. If PRECISION is too low, these printed values have fewer digits than desired; that is, ranges have grown too large, and the entire computation must be repeated at a higher PRECISION” (*see* Aberth, p. 484). Aberth controls the range of the result using “PRECISION” to limit mantissa length and will repeat the computation at a higher “PRECISION” “when the final ranges show this to be necessary” (*see* Aberth p. 488).

In contrast, the amended independent claims require, in part, that for each operation performed on the floating-point variable, the runtime logging utility: (i) increments the operations variable corresponding to the operation performed; (ii) determines a scaled mantissa for the resultant value (*i.e.*, the value generated by applying the operation to the floating-point variable);

(iii) compares the scaled mantissa with the resultant value to determine whether the resultant value is exact; (iv) quantifies the error associated with the resultant value when the resultant value is not exact; and (v) stores the resultant value, the scaled mantissa, and the error value when the resultant value is not exact. Clearly, the aforementioned actions performed by the runtime logging utility are not encompassed in the functionality for calculating a "PRECISION" result, as discussed in Aberth.

In view of the above, amended independent claim 1 is patentable over Kolawa and Aberth, whether viewed separately or in combination. Amended independent claim 30 includes similar patentable limitations as amended independent claim 1 and, thus, is patentable over Kolawa and Aberth for at least the same reasons as amended independent claim 1. Dependent claims are patentable over Kolawa and Aberth for at least the same reasons. Withdrawal of this rejection is respectfully requested.

### **Conclusion**

The Applicants believe this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 33226/367001; SUN040407).

Dated: April 2, 2008

Respectfully submitted,

By /Robert P. Lord/

Robert P. Lord  
Registration No.: 46,479  
OSHA · LIANG LLP  
1221 McKinney St., Suite 2800  
Houston, Texas 77010  
(713) 228-8600  
(713) 228-8778 (Fax)  
Attorney for Applicants